1. (Twice Amended): A method of establishing wireless communications between an interrogator and individual ones of multiple wireless identification devices, the wireless identification devices having respective identification numbers and being addressable by specifying identification numbers with any one of multiple possible degrees of precision, the method comprising utilizing a tree search in an arbitration scheme to determine a degree of precision necessary to establish one-on-one communications between the interrogator and individual ones of the multiple wireless identification devices, a search tree being defined for the tree search method, the tree having multiple selectable levels respectively representing subgroups of the multiple wireless identification devices, the level at which a tree search starts being variable the method further comprising starting the tree search at any [selectable level of the search tree] selectable level other than the top level of the search tree.

2. A method in accordance with claim 1 and further comprising determining the maximum possible number of wireless identification devices that could communicate with the interrogator, and selecting a level of the search tree based on the determined maximum possible number of wireless identification devices that could communicate with the interrogator.

3. A method in accordance with claim 2 and further comprising starting the tree search at a level determined by taking the base two logarithm of the determined maximum possible number, wherein the level of the tree containing all subgroups is considered level zero, and lower levels are numbered consecutively.

4. A method in accordance with claim 2 and further comprising starting the tree search at a level determined by taking the base two logarithm of the determined maximum possible number, wherein the level of the tree containing all subgroups is considered level zero, and lower levels are numbered consecutively, and wherein the maximum number of devices in a subgroup in one level is half of the maximum number of devices in the next higher level.

5. A method in accordance with claim 2 and further comprising starting the tree search at a level determined by taking the base two logarithm of the power of two nearest the determined maximum possible number, wherein the level of the tree containing all subgroups is considered level zero, and lower levels are numbered consecutively, and wherein the maximum number of devices in a subgroup in one level is half of the maximum number of devices in the next higher level.

6. A method in accordance with claim 1 wherein the wireless identification device comprises an integrated circuit including a receiver, a modulator, and a microprocessor in communication with the receiver and modulator.

7. A method of addressing messages from an interrogator to a selected one or more of a number of communications devices, the method comprising:

establishing for respective devices unique identification numbers respectively having a first predetermined number of bits;

establishing a second predetermined number of bits to be used for random values;

causing the devices to select random values, wherein respective devices choose random values independently of random values selected by the other devices;

determining the maximum number of devices potentially capable of responding to the interrogator;

transmitting a command from the interrogator requesting devices having random values within a specified group of random values to respond, by using a subset of the second predetermined number of bits, the specified group being chosen in response to the determined maximum number;

receiving the command at multiple devices, devices receiving the command respectively determining if the random value chosen by the device falls within the specified group and, if so, sending a reply to the interrogator; and

determining using the interrogator if a collision occurred between devices that sent a reply and, if so, creating a new, smaller, specified group.

8. A method of addressing messages from an interrogator to a selected one or more of a number of communications devices in accordance with claim 7 wherein sending a reply to the interrogator comprises transmitting the unique identification number of the device sending the reply.

9. A method of addressing messages from an interrogator to a selected one or more of a number of communications devices in accordance with claim 7 wherein sending a reply to the interrogator comprises transmitting the random value of the device sending the reply.

10. A method of addressing messages from an interrogator to a selected one or more of a number of communications devices in accordance with claim 7 wherein sending a reply to the interrogator comprises transmitting both the random value of the device sending the reply and the unique identification number of the device sending the reply.

11. A method of addressing messages from an interrogator to a selected one or more of a number of communications devices in accordance with claim 7 wherein, after receiving a reply without collision from a device, the interrogator sends a command individually addressed to that device.

12. A method of addressing messages from an interrogator to a selected one or more of a number of communications devices, the method comprising:

causing the devices to select random values for use as arbitration numbers, wherein respective devices choose random values independently of random values selected by the other devices, the devices being addressable by specifying arbitration numbers with any one of multiple possible degrees of precision;

transmitting a command from the interrogator requesting devices having random values within a specified group of a plurality of possible groups of random values to respond, the specified group being less than the entire set of random values, the plurality of possible groups being organized in a binary tree defined by a plurality of nodes at respective levels, wherein the size of groups of random values decrease in size by half with each node descended, wherein the specified group is below a node on the tree selected based on the maximum number of devices capable of communicating with the interrogator;

receiving the command at multiple devices, devices receiving the command respectively determining if the random value chosen by the device falls within the specified group and, if so, sending a reply to the interrogator; and, if not, not sending a reply; and

determining using the interrogator if a collision occurred between devices that sent a reply and, if so, creating a new, smaller, specified group by descending in the tree.

13. A method of addressing messages from an interrogator to a selected one or more of a number of communications devices in accordance with claim 12 and further including establishing a predetermined number of bits to be used for the random values.

14. A method of addressing messages from an interrogator to a selected one or more of a number of communications devices in accordance with claim 13 wherein the predetermined number of bits to be used for the random values comprises an integer multiple of eight.

15. A method of addressing messages from an interrogator to a selected one or more of a number of communications devices in accordance with claim 13 wherein devices sending a reply to the interrogator do so within a randomly selected time slot of a number of slots.

16. (Amended): A method of addressing messages from an interrogator to a selected one or more of a number of RFID devices, the method comprising:

establishing for respective devices a predetermined number of bits to be used for random values, the predetermined number being a multiple of sixteen;

causing the devices to select random values, wherein respective devices choose random values independently of random values selected by the other devices;

transmitting a command from the interrogator requesting devices having random values within a specified group of a plurality of possible groups of random values to respond, the specified group being equal to or less than the entire set of random values, the plurality of possible groups being organized in a binary tree defined by a plurality of nodes at respective levels, wherein the maximum size of groups of random values decrease in size by half with each node descended, wherein the specified group is below a node on a level of the tree selected based on the maximum number of devices known to be capable of communicating with the interrogator;

receiving the command at multiple devices, devices receiving the command respectively determining if the random value chosen by the device falls within the specified group and, only if so, sending a reply to the interrogator, wherein sending a reply to the interrogator comprises transmitting both the random value of the device sending the reply and [the unique] a unique identification number of the device sending the reply;

using the interrogator to determine if a collision occurred between devices that sent a reply and, if so, creating a new, smaller, specified group using a level of the tree different from the level used in the interrogator transmitting, the interrogator transmitting a command requesting devices having random values within the new specified group of random values to respond; and

if a reply without collision is received from a device, the interrogator subsequently sending a command individually addressed to that device.

17. A method of addressing messages from an interrogator to a selected one or more of a number of RFID devices in accordance with claim 16 and further comprising determining the maximum possible number of wireless identification devices that could communicate with the interrogator.

Claim 18 is amended as follows:

18. (Amended): A method of addressing messages from an interrogator to a selected one or more of a number of RFID devices in accordance with claim 17 [claim 16] wherein selecting the level of the tree comprises taking the base two logarithm of the determined maximum possible number, wherein a level of the tree containing all subgroups is considered level zero, and lower levels are numbered consecutively.

Claim 19 is amended as follows:

19. (Amended): A method of addressing messages from an interrogator to a selected one or more of a number of RFID devices in accordance with claim 17 [claim 16] wherein selecting the level of the tree comprises taking the base two logarithm of the determined maximum possible number, wherein a level of the tree containing all subgroups is considered level zero, and lower levels are numbered consecutively, and wherein the maximum number of devices in a subgroup in one level is half of the maximum number of devices in the next higher level.

Claim 20 is amended as follows:

20. (Amended): A method of addressing messages from an interrogator to a selected one or more of a number of RFID devices in accordance with claim 17 [claim 16] wherein selecting the level of the tree comprises taking the base two logarithm of the power of two nearest the determined maximum possible number, wherein the level of the tree containing all subgroups is considered level zero, and lower levels are numbered consecutively, and wherein the maximum number of devices in a subgroup in one level is half of the maximum number of devices in the next higher level.

21. A method of addressing messages from an interrogator to a selected one or more of a number of RFID devices in accordance with claim 16 wherein the wireless identification device comprises an integrated circuit including a receiver, a modulator, and a microprocessor in communication with the receiver and modulator.

22. A method of addressing messages from an interrogator to a selected one or more of a number of RFID devices in accordance with claim 16 and further comprising, after the interrogator transmits a command requesting devices having random values within the new specified group of random values to respond, determining, using devices receiving the command, if their chosen random values fall within the new smaller specified group and, if so, sending a reply to the interrogator.

23. A method of addressing messages from an interrogator to a selected one or more of a number of RFID devices in accordance with claim 22 and further comprising, after the interrogator transmits a command requesting devices having random values within the new specified group of random values to respond, determining if a collision occurred between devices that sent a reply and, if so, creating a new specified group and repeating the transmitting of the command requesting devices having random values within a specified group of random values to respond using different specified groups until all of the devices within communications range are identified.

Claim 24 is amended as follows:

24. (Twice Amended): A communications system comprising an interrogator, and a plurality of wireless identification devices configured to communicate with the interrogator in a wireless fashion, the wireless identification devices having respective identification numbers, the interrogator being configured to employ a tree search in a search tree having multiple selectable levels, to determine the identification numbers of the [different] wireless identification devices with sufficient precision so as to be able to establish one-on-one communications between the interrogator and individual ones of the [multiple] wireless identification devices, wherein the interrogator is configured to start the tree search at any [selectable level of the search tree] selectable level other than the top level of the search tree.

25. A communications system in accordance with claim 24 wherein the tree search is a binary tree search.

26. A communications system in accordance with claim 24 wherein the wireless identification device comprises an integrated circuit including a receiver, a modulator, and a microprocessor in communication with the receiver and modulator.

Claim 27 is amended as follows:

27. (Amended): A system comprising:

an interrogator;

a number of communications devices capable of wireless communications with the interrogator;

means for establishing a predetermined number of bits to be used as random numbers, and for causing respective devices to select random numbers respectively having the predetermined number of bits;

means for inputting a predetermined number indicative of the maximum number of devices possibly capable of communicating with the interrogator [receiver];

means for causing the interrogator to transmit a command requesting devices having random values within a specified group of random values to respond, the specified group being chosen in response to the inputted predetermined number;

means for causing devices receiving the command to determine if their chosen random values fall within the specified group and, if so, send a reply to the interrogator; and

means for causing the interrogator to determine if a collision occurred between devices that sent a reply and, if so, create a new, smaller, specified group.

28. A system in accordance with claim 27 wherein sending a reply to the interrogator comprises transmitting the random value of the device sending the reply.

29. A system in accordance with claim 27 wherein the interrogator further includes means for, after receiving a reply without collision from a device, sending a command individually addressed to that device.

30. A system comprising:

an interrogator configured to communicate to a selected one or more of a number of communications devices;

a plurality of communications devices;

the devices being configured to select random values, wherein respective devices choose random values independently of random values selected by the other devices, different sized groups of devices being addressable by specifying random values with differing levels of precision;

the interrogator being configured to transmit a command requesting devices having random values within a specified group of a plurality of possible groups of random values to respond, the specified group being less than the entire set of random values, the plurality of possible groups being organized in a binary tree defined by a plurality of nodes at respective levels, wherein the size of groups of random values decrease in size by half with each node descended, wherein the specified group is below a node on the tree selected based on a predetermined maximum number of devices capable of communicating with the interrogator.

devices receiving the command being configured to respectively determine if their chosen random values fall within the specified group and, if so, send a reply to the interrogator; and, if not, not send a reply; and

the interrogator being configured to determine if a collision occurred between devices that sent a reply and, if so, create a new, smaller, specified group by descending in the tree.

31. A system in accordance with claim 30 wherein the random values respectively have a predetermined number of bits.

32. A system in accordance with claim 30 wherein respective devices are configured to store unique identification numbers of a predetermined number of bits.

33. A system in accordance with claim 30 wherein respective devices are configured to store unique identification numbers of sixteen bits.

Claim 34 is amended as follows:

34. (Amended): A system comprising:

an interrogator configured to communicate to a selected one or more of a number of RFID devices;

a plurality of RFID devices, respective devices being configured to store unique identification numbers respectively having a first predetermined number of bits, respective devices being further configured to store a second predetermined number of bits to be used for random values, respective devices being configured to select random values independently of random values selected by the other devices;

the interrogator being configured to transmit an identify command requesting a response from devices having random values within a specified group of a plurality of possible groups [or random] of random values, the specified group being less than or equal to the entire set of random values, the plurality of possible groups being organized in a binary tree defined by a plurality of nodes at respective levels, wherein the maximum size of groups of random values decrease in size by half with each node descended, wherein the specified group is below a node on a level of the tree selected based on the maximum number of devices known to be capable of communicating with the interrogator;

devices receiving the command respectively being configured to determine if their chosen random values fall within the specified group and, only if so, send a reply to the interrogator, wherein sending a reply to the interrogator comprises transmitting both the random value of the device sending the reply and the unique identification number of the device sending the reply;

the interrogator being configured to determine if a collision occurred between devices that sent a reply and, if so, create a new, smaller, specified group using a level of the tree different from the level used in previously transmitting an identify command, the interrogator transmitting an identify command requesting devices having random values within the new specified group of random values to respond; and

the interrogator being configured to send a command individually addressed to a device after communicating with a device without a collision.

Claim 35 is amended as follows:

35. (Amended) A system in accordance with claim 34 wherein the interrogator is configured to input and store [the predetermined number] a number representing the specified group.

36. A system in accordance with claim 34 wherein the devices are configured to respectively determine if their chosen random values fall within a specified group and, if so, send a reply, upon receiving respective identify commands.

37. A system in accordance with claim 36 wherein the interrogator is configured to determine if a collision occurred between devices that sent a reply in response to

Claims 38-81 cancelled.

Please add new claims 82-120.

82. A method comprising:

disposing a plurality of radio frequency identification (RFID) tags in a communication field of an interrogator, each respective tag of the plurality of tags including respective memory storing a respective identification code that identifies a respective object to which each respective tag is affixed;

sending a select command from the interrogator to the plurality of tags after disposing the plurality of tags in the field and before any of the plurality of tags communicate to the interrogator, the select command including a set of parameters, the set of parameters including a bit string and describing a memory range, the memory range comprising multiple bit locations;

each respective tag of the plurality of tags receiving the select command and comparing the bit string against the memory range of the respective memory of each respective tag to determine if the respective tag is a member of a population of tags;

each respective tag of the population picking a respective random value and associating the random value with a respective slot, wherein a sequence in which the population of tags are to reply to the interrogator is determined by each respective slot;

each respective tag of at least a portion of the population backscattering a respective rep to the interrogator, each respective reply including a respective random number generated by each respective tag, each respective tag replying in accordance with the sequence; and

sending an acknowledge command from the interrogator in response to the interrogator receiving a respective reply from a respective tag and determining the respective reply to be collision-free.

83. The method of claim 82, further comprising each respective tag of the at least a portion of the population backscattering at least a portion of the respective identification code.

84. The method of claim 83, further comprising the interrogator accessing a tag individually after receiving the random number from the tag, accessing the tag including the interrogator sending the random number to the tag.

85. The method of claim 84, wherein the memory range of the memory of the tag includes at least a portion of the random number.

86. The method of claim 82, wherein each respective random number generated by each respective tag is sixteen bits in length.

87. A method comprising:

affixing a radio frequency identification (RFID) tag to an object, the tag including tag memory;

disposing the tag in a communication field of an interrogator;

sending a first signal from the interrogator to the tag after disposing the tag in the field and before the tag communicates to the interrogator, the first signal including parameters that describe a memory range and a bit string;

receiving the first signal at the tag, and in response thereto, comparing the bit string against the memory range of the tag memory to determine if the tag is selected, the memory range of the tag memory storing a plurality of bits;

the tag picking a random value and associating the random value with a slot in accordance with an arbitration scheme for an inventory operation if the tag is determined to be selected;

sending a second signal from the interrogator to the tag;

backscattering a random number generated by the tag from the tag to the interrogator in accordance with the slot in response to receiving the second signal; and

sending an acknowledge command from the interrogator to the tag in response to the interrogator receiving the random number.

88. The method of claim 87, further comprising backscattering at least a portion of an identification code from the tag to the interrogator, wherein the identification code is stored in tag memory and identifies the object.

89. The method of claim 88, further comprising the interrogator individually accessing the tag after the interrogator sends the acknowledge command and receives the at least a portion of the identification code, wherein individually accessing the tag includes the interrogator sending an access command to the tag, the access command including the random number.

90. The method of claim 89, wherein the random number is sixteen bits long.

91. The method of claim 87, wherein the plurality of bits includes at least a portion of the random number.

92. (Amended) A method comprising:

[attaching]

disposing a radio frequency identification (RFID) tag in a communication field of an interrogator, the tag including tag memory;

sending a select command from the interrogator to the tag after disposing the tag in the field and before the tag communicates to the interrogator, the select command including parameters that describe a memory range and a bit string;

receiving the select command at the tag, and in response thereto, comparing the bit string against the memory range of the tag memory to determine if the tag is selected, the memory range of the tag memory storing at least two bits; and

communicating a random number generated by the tag from the tag to the interrogator in accordance with an arbitration scheme if the tag is determined to be selected.

93. The method of claim 92, wherein the random number is stored in the tag memory.

94. The method of claim 92, wherein the at least two bits include at least a portion of the random number.

95. The method of claim 92, further comprising communicating at least a portion of an identification code from the tag to the interrogator in accordance with the arbitration scheme, wherein the identification code identifies an object to which the tag is affixed.

96. The method of claim 95, wherein the identification code is stored in the tag memory.

97. The method of claim 92, wherein the random number is sixteen bits long.

98. The method of claim 92, further comprising the tag picking a random value and using the random value as a slot, the tag communicating the random number at a time associated with the slot in accordance with the arbitration scheme.

99. The method of claim 98, further comprising sending an acknowledge command from the interrogator to the tag in response to the interrogator receiving the random number.

100. The method of claim 99, further comprising sending a signal from the interrogator to the tag, after sending the select command from the interrogator to the tag and before communicating the random number from the tag to the interrogator, wherein the signal indicates to the tag the time to communicate the random number.

101. The method of claim 92, further comprising sending a signal from the interrogator to the tag, after sending the select command from the interrogator to the tag and before communicating the random number from the tag to the interrogator, wherein the signal indicates to the tag when to communicate the random number to the interrogator.

102. The method of claim 92, wherein communicating the random number includes backscattering the random number.

103. The method of claim 92, further comprising sending an acknowledge command from the interrogator to the tag in response to the interrogator receiving the random number.

104. The method of claim 103, further comprising communicating at least a portion of an identification code from the tag to the interrogator in accordance with the arbitration scheme, wherein the identification code identifies an object to which the tag is affixed.

105. The method of claim 104, further comprising the interrogator individually accessing the tag after receiving the random number, wherein individually accessing the tag includes the interrogator sending an access command to the tag, the access command including a sixteen bit random number.

106. The method of claim 105, wherein the sixteen bit random number is the random number generated by the tag and communicated from the tag to the interrogator in accordance with the arbitration scheme.

107. A method comprising:

disposing a plurality of radio frequency identification (RFID) tags in a communication field of an interrogator;

sending a first signal from the interrogator to first and second tags of the plurality of tags after disposing the plurality of tags in the field and before any of the plurality of tags communicate to the interrogator, the first signal including a bit string and indicating a portion of memory, the portion of memory comprising multiple bit storage locations, the first tag having

stored therein a first set of bits in bit storage locations corresponding to the portion of memory, and the second tag having stored therein a second set of bits in bit storage locations corresponding to the portion of memory;

the first tag receiving the first signal and comparing the bit string against the first set of bits to determine if the first tag is selected;

the second tag receiving the first signal and comparing the bit string against the second set of bits to determine if the second tag is selected;

the first tag picking a first random value and associating the first random value with a first slot in accordance with an arbitration scheme;

the second tag picking a second random value and associating the second random value with a second slot in accordance with the arbitration scheme;

the first tag backscattering a first identification code that identifies a first object to which the first tag is affixed; and

the second tag backscattering a second identification code that identifies a second object to which the second tag is affixed.

108. The method of claim 107, further comprising:

the first tag backscattering a first random number generated by the first tag;

and the second tag backscattering a second random number generated by the second tag.

109. The method of claim 108, further comprising:

the interrogator receiving the first random number from the first tag during a period of time associated with the first slot, and, in response thereto, the interrogator sending a first acknowledge signal to acknowledge the first tag; and

the interrogator receiving the second random number from the second tag during a period of time associated with the second slot, and, in response thereto, the interrogator sending a second acknowledge signal to acknowledge the second tag.

110. The method of claim 109, further comprising the interrogator accessing the first tag individually after receiving both the first random number and the first identification code

from the first tag, accessing the first tag including the interrogator sending a command that includes a number randomly generated by the first tag that identifies the first tag.

111. The method of claim 110, wherein the number randomly generated by the first tag that identifies the first tag is the first random number, and the first random number is 16 bits in length.

112. The method of claim 111, further comprising sending a second signal from the interrogator after sending the first signal from the interrogator, the first tag backscattering the first identification code in response to receiving the second signal.

113. The method of claim 107, further comprising:

the interrogator sending a first acknowledge signal to acknowledge the first tag;

and the interrogator sending a second acknowledge signal to acknowledge the second tag.

114. (Amended) A method comprising:

disposing a radio frequency identification (RFID) tag in a communication field of an interrogator;

sending a first command from the interrogator to the tag after disposing the tag in the field and before the tag communicates to the interrogator, the first command including a first set of fields comprising at least two first bit values;

the tag wirelessly receiving the first command;

the tag backscattering a first reply based, at least in part, on whether the two first bit values received from the interrogator match two corresponding bit values stored in the tag, the first reply including a random number generated by the tag;

sending a second command from the interrogator to the tag, the second command including a second set of fields comprising at least two second bit values;

the tag wirelessly receiving the second command; and

the tag backscattering a second reply based, at least in part, on whether the two second bit values received from the interrogator match the two corresponding bit values stored in the tag, the second reply including a random number generated by the tag.

115. The method of claim 114, further comprising backscattering at least a portion of an identification code from the tag to the interrogator, wherein the identification code identifies an object to which the tag is affixed.

116. The method of claim 114, further comprising the tag picking a random value and using the random value as a slot in accordance with an arbitration scheme, the tag backscattering a signal to the interrogator at a time associated with the slot.

117. The method of claim 116, further comprising sending an acknowledge command from the interrogator to the tag.

118. The method of claim 114, further comprising the interrogator individually accessing the tag, wherein individually accessing the tag includes the interrogator sending an access command to the tag, the access command including a sixteen bit random number.

119. The method of claim 118, further comprising backscattering at least a portion of an identification code from the tag to the interrogator, wherein the identification code identifies an object to which the tag is affixed.

120. The method of claim 114, further comprising the interrogator detecting a collision upon receiving the first reply.